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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/539,243	07/29/2005	Yuichi Takai	112857-463	9242
29175 7590 02/05/2009 BELI., BOYD & LLOYD, LLP P. O. BOX 1135 CHICAGO, IL 60690				
EXAMINER				
HAN, KWANG S				
ART UNIT		PAPER NUMBER		
1795				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/539,243

**Applicant(s)**

TAKAI, YUICHI

**Examiner**

Kwang Han

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 November 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 13-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date: \_\_\_\_\_

**FUEL CELL SEPARATOR, FUEL CELL DEVICE, AND ELECTRONIC APPLIED  
DEVICE**

Examiner: K. Han    SN: 10/539,243    Art Unit: 1795    February 5, 2009

**DETAILED ACTION**

1.     The Applicant's amendment filed on November 5, 2008 was received. Claims 13 and 23-24 were amended.
2.     The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

***Specification***

3.     The Applicant's substitute specification has been entered.

***Claim Rejections - 35 USC § 102***

4.     The claim rejections under 35 U.S.C. 102(b) as being anticipated by Goto et al. on claims 13-16 and 23 are withdrawn, because the independent claim 13 has been amended.

***Claim Rejections - 35 USC § 103***

5.     The claim rejection under 35 U.S.C. 103(a) as unpatentable over Goto et al. as applied to claims 13 and 14 and further in view of Shiue et al. on claims 17-20 are withdrawn, because independent claim 13 has been amended.

6. The claim rejection under 35 U.S.C. 103(a) as unpatentable over Goto et al. as applied to claims 13 and further in view of Kobayashi on claim 21 is withdrawn, because independent claim 13 has been amended.

7. The claim rejection under 35 U.S.C. 103(a) as unpatentable over Goto et al. as applied to claims 14 and further in view of Shiue et al. and Khandkar et al. on claim 22 is withdrawn, because independent claim 13 has been amended.

8. The claim rejection under 35 U.S.C. 103(a) as unpatentable over Goto et al. and Pratt et al. on claim 24 is withdrawn, because claim 24 has been amended.

9. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goto et al. (JP 07-249419, online translation) in view of Kobayashi (US 5258239).

Regarding claims 13, Goto is directed towards a fuel cell separator comprised of the following:

- a separator body adapted to contact with a generating element (2, 3) creating a generating cell [0041, 0042],
- grooves (60, supply channel) formed on separator body (1), and
- flow quantity control valves (59, fluid oxidant supplying means) provided on separator body for supplying fluid oxidant into the fluid oxidant channel (Drawings 2 and 3).

Goto is silent towards the fluid oxidant supplying means comprises at least one element selected from the group consisting of a fan and a pump.

Goto and Kobayashi are analogous art because both deal with the same problem solving area of providing fluid flow through a fuel cell device. To one of ordinary skill in the art a metal-air cell is a type of fuel cell.

Kobayashi teaches the use of a diaphragm pump (Figure 2B) in a metal-air cell to provide air flow which is integrated with the cell casing (1) which forms the air flow channel (2) to provide air supply control and enhance the electrical characteristics of the cell (Column 2, Lines 14-18). It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Kobayashi's diaphragm pump in place of the flow control valve in Goto's separator because Kobayashi teaches that this pump is a device which can provide air supply control and enhance the electrical characteristics of the cell.

Regarding claim 14, Goto et al. discloses a groove (60) having an opening exposed to one end of the separator body (Drawing 4) and a fluid flow quantity control valve (59) provided at the opening to provide a flow of fluid oxidant in the supply channel (Drawing 4) [Abstract].

Regarding claim 15, Goto et al. is directed towards grooves comprising a plurality of channels formed on the separator body (Drawing 4) and each of the channels have an opening with a plurality of supplying means provided at the openings of the channels to individually make a flow of the fluid oxidant in the channels [Abstract].

Regarding claim 16, Goto et al. is further directed towards a separator with a plurality of groups of adjacent channels (60) with each group of adjacent channels having an opening (Drawing 5) and a fluid oxidant supplying means (59) provided at the opening of the groups of the adjacent channels.

Regarding claim 21, the Applicant is directed towards the discussion for claim 13 above.

Regarding claim 23, the teachings of Goto et al. as discussed above are herein incorporated. Goto et al. is further directed towards a fuel cell body formed by stacking a plurality of generating cells with a pair of separators [0040] (Drawing 2).

10. Claims 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goto et al. and Kobayashi as applied to claim 13 and 14 above, and further in view of Shiue et al. (US 6500575).

Regarding claims 17-20 the teachings of Goto as discussed above are herein incorporated. Goto et al. discloses a flow quantity control valve (59, 69) having a fin to be oscillated (Drawing 3) to provide a flow of said fluid oxidant and an actuator (bimetal) [0018, 0020] comprised of a shape memory alloys [0020] with different coefficients of thermal expansion [0045] for driving the fin but is silent towards the fluid oxidant supply means being a fan.

Shiue teaches the use of a micro fan in a zinc-air cell to control air flow between air pathways [Abstract] which are fabricated with an actuator comprising a piezoelectric (Column 5, Lines 20-46) for the benefit of providing air draft in the cell used to generate

electricity. It would have been obvious to one of ordinary skill in the art at the time of the invention to use Shiue's micro fan as the fluid oxidant supply means in Goto's fuel cell because Shiue teaches it as a means to provide greater air draft.

11. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goto et al. and Kobayashi as applied to claim 14 above, and further in view of Shiue et al. (US 6500575) and Khandkar et al. (US 5856035).

The teachings of Goto et al. and Kobayashi as discussed above are herein incorporated. Goto further discloses the fluid oxidant channels to be formed inside of the separator body, extending along the surface (Drawings 5, 6), but is silent towards the opening elongated in the transverse direction and the fluid oxidant supply means comprising a rotary fan.

Khandkar teaches the use of a separator (44) which includes a trough structure (40, Figure 1) having an elongated opening for the benefit of providing cavities for fuel or air flow (Column 6, Lines 17-25; Figure 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Khandkar's elongated opening within the separator structure of Goto and Kobayashi's fuel cell because Khandkar teaches this structure provides for a larger cavity to increase fuel and air flow.

Shiue et al. teaches the use of a micro rotary fan (Column 5, Lines 38-41) in a zinc-air cell to control air flow between separators [Abstract] for the benefit of providing air draft in the cell. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Shiue's micro rotary fan in Goto's separator modified by

Khandkar's elongated opening because Shiue teaches it as a device which provides the maximum air draft.

12. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goto et al. in view of Kobayashi and further in view of Pratt et al. (US 6127058).

The teachings of Goto et al. and Kobayashi as discussed above are herein incorporated. The applicant is directed towards the discussion concerning claim 13 above. Goto is silent towards an electronic applied device comprising a board wherein pluralities of fuel cell bodies are provided.

Pratt teaches a planar fuel cell where a plurality of fuel cell bodies (Figure 2; Column 4, Lines 31-38) are connected with each other on a board (24, frame) for the benefit of minimizing seals, piping, and electrical interconnections. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Pratt's planar fuel cell arrangement in Goto and Kobayashi's fuel cell because Pratt teaches it minimizes the fuel cell profile and use of seals, piping and electrical interconnections.

### ***Response to Arguments***

13. Applicant's arguments filed November 5, 2008 have been fully considered but they are not persuasive.

*Applicant's principal arguments are:*



*(a) the Goto reference does not teach a fluid oxidant supplying means comprising at least one element selected from the group consisting of a fan and a pump on the separator body;*

*(b) Goto fails to disclose or suggest fluid oxidant supplying means provided on a separator body for supplying a fluid oxidant into a fluid oxidant supply channel;*

*(c) the Shiue reference involves rechargeable metal-air batteries, fuel cells and batteries are different technologies and so the references are not combinable;*

*(d) the Goto and Shiue references are directed towards solving different problems, Goto to provide more equal temperature distribution and Shiue towards supplying air;*

*(e) the Kobayashi reference relates to a metal-air battery, which are different technologies with different problems. Goto teaches providing more equal temperature distribution and Kobayashi to controlling the amount of air supplied to the battery.*

In response to Applicant's arguments, please consider the following comments:

(a) the Goto reference teaches a fluid oxidant supply means on the separator body (Drawing 2 and 4) defined by the flow quantity control valve as outlined in the discussion above. The Kobayashi reference teaches an oxidant supply means defined by a pump which in combination with the Goto placement of the fluid oxidant means is used to meet the limitations of the supplying means consisting of either a fan or a pump on the separator. The definition of supply, the root word of supplying, is defined by The American Heritage Dictionary as: "to make available for use; provide". Based on this

definition, the valves of Goto provide a function of making the oxidant supply available or not available which can also be applied to the pump of Kobayashi.;

(b) Goto teaches a fluid oxidant supplying means defined by the flow quantity control valve on the separator body providing oxidant flow. As described within the abstract, the control valve reduces or increases the quantity of flow of the oxidant gas meeting the limitations of an oxidant supply means. The term "fluid oxidant supply means" has been interpreted as any means which have an affect on the supply or flow of the oxidant;

(c) to one of ordinary skill in the art, a metal-air cell battery is a type of fuel cell which requires a flow of reactant (air) to provide fuel for the cell to work. Both the Goto reference [Abstract] and the Shiue reference [Abstract] teach means to provide a flow of oxidant material through the body of a fuel cell, thus providing sufficient motivation to combine;

(d) the Examiner agrees that the Goto and Shiue are directed toward solving different problems, however both references teach methods of controlling fluid flow through a fuel cell. It would have been obvious to one of ordinary skill in the fuel cell art to use the fluid control means of Shiue or Kobayashi in Goto's fuel cell separator because it is well recognized in the art that oxidant flow through a fuel cell can be used to provide the reactant gas and also be used as a means of temperature control and if required further evidenced by Yang et al. (US 6572995) (Columns 1 and 2).

(e) to one of ordinary skill in the art, metal-air batteries are considered to be a type of fuel cell. As stated by the Applicant, "fuel cells are different from electrochemical

cell batteries in that they consume reactant.” For a metal-air batteries the reactant is air which must be provided for the cell to work, hence by the Applicant's definition fitting the definition for a fuel cell for both the Shiue and Kobayashi reference.

### ***Conclusion***

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

### ***Contact/Correspondence Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kwang Han whose telephone number is (571) 270-5264. The examiner can normally be reached on Monday through Friday 8:00am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. H./  
Examiner, Art Unit 1795

/Dah-Wei D. Yuan/  
Supervisory Patent Examiner, Art Unit 1795